



PLANT PROTECTION BULLETIN

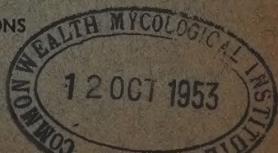
A Publication of the
WORLD REPORTING SERVICE ON PLANT DISEASES AND PESTS

VOL. I, No. 11

AUGUST, 1953

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FAO PLANT PROTECTION BULLETIN

is issued as a medium for the dissemination of information received by the World Reporting Service on Plant Diseases and Pests, established in accordance with the provisions of the International Plant Protection Convention, 1951. It publishes reports on the occurrence, outbreak and control of pests and diseases of plants and plant products of economic significance and related topics, with special reference to current information. No responsibility is assumed by FAO for opinions and viewpoints expressed in the Bulletin.

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FAO Plant Protection Bulletin

VOL. I, No. 11

A Publication of the

AUGUST 1953

World Reporting Service on Plant Diseases and Pests

Insect Pests in British Colonial Dependencies: a Half Yearly Report

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Federation of Malaya

IT is reported¹ that the onion leaf miner (*Dizygomyza cepae* Hering) appears now to be well established in Johore, and has been found still farther north, in Selangor, at two sites fifteen miles from Kuala Lumpur.

The larva of the Java cacao moth (*Acrocercops cramerella* Sn.) was taken on fruits of *Nephelium lappaceum* Linn. in January 1953 for the third time since 1949. So far this pest has not been reported on cacao in Malaya.

In the field of control, some success has been obtained with dieldrin against the two Cerambycid clove borers, *Niraeus tricolor* Newm. and *Aphrodisium* sp. Further tests have been started.

(Report from Chief Research Officer, Department of Agriculture, Federation of Malaya).

Singapore

Attention is drawn to a note by Lever² on new and recently introduced pests in Singapore but absent from Malaya. The pests mentioned include *Coptotermes parvulus* Holmgr., *Promecotheca cumingi* Baly, *Caryobruchus gleditsiae* L., *Plodia interpunctella* (Hb.), *Gnorimoschema operculella* (Zell.) and *Dolichotetranychus floridanus* (Banks).

Tanganyika

The white coffee borer (*Anthores leuconotus* Pasc.) which has become a serious pest of coffee in the Northern Province³ has continued to extend its boundaries in spite of serious attempts to control it. Certain aspects of its biology have been studied and small-scale field trials with DDT and dieldrin have shown some promise. (Report from the Entomologist, Lyamungu).

Anthores leuconotus is stated by Chevalier⁴ to be the most important pest of *Coffea arabica* in many parts of tropical Africa, particularly in the Belgian Congo.

Maize stalk borer, *Busseola fusca* (Fuller) and *Proceras argyrolepida* Hmps. have for several years caused extensive damage to native-grown maize on the slopes of Kilimanjaro. It was found that a very large population of larvae persisted long after maize harvest in narrow belts of perennial sorghum, and appropriate action was taken. Elsewhere in Tanganyika enquiry is also being made into the manner in which these two species span the dry season. (Reports from the Entomologists, Lyamungu and Morogoro).

¹ See FAO Plant Prot. Bull., 1: 139. 1953.

² LEVER, R. J. A. W. *New or recently introduced pests in Singapore, absent from the Federation of Malaya.* Malay. Agr. Jour. 35: 215-217. 1952.

³ See Ann. Rep. Dep. Agr. Tanganyika 1950, p. 173. 1952.

⁴ CHEVALIER, A. *Les Caféiers du Globe*, p. 270. 1947.

Zanzibar

Theraptus sp. (Hemiptera, Coreidae), a sucking bug which was first shown in 1950⁵ to be responsible for gumming disease and premature nut-fall in coconut, is increasing fairly rapidly and could eventually

⁵ See Ann. Rep. Dep. Agr. Zanzibar 1950, p. 4, 1952; *op. cit.*, 1951, pp. 3, 15, 1953.

seriously incommode the copra industry. The increase is due to the eradication of its predator ant, *Oecophylla longinoda* (Latr.), by the introduced ant *Anoplolepis longipes* (Jerd.), which, under conditions in Zanzibar, comes into competition with *Oecophylla*. Attempts are being made to re-establish the balance, and spraying experiments in direct attack on *Theraptus* are in progress. Control of the bug would probably effect a 25-30 percent increase of crop.

TITLES SELECTED

No. 1.

The desert locust situation
Potato blight in Chile
Progress in plant protection in India

No. 2.

The locust problem in Central America and Mexico
Pineapple diseases and pests in Mexico
Insect problems in Nicaragua

No. 3.

The migratory locust in South America
Plant disease situation in the United States
Two important tree borers in Israel

No. 4.

Disease outbreaks on economic plants in Italy
Major pests of crops in Afghanistan
Wheat rusts in Spain in 1952

No. 5.

International Plant Protection Convention: its history, objectives and present status
Plant disease situation in the United States
Virus diseases of cereals in Canada

No. 6.

Plant disease situation in the United States
A foliar disease of legumes in Central America
International Wheat Rust Conference

No. 7.

Plant pathology in Colombia
Control of olive fly in Israel

No. 8.

Plant disease situation in the United States
Apple leaf-curling midge, a new pest in New Zealand
Turnip mosaic of swedes in Eastern Canada

No. 9.

Observations on the Mediterranean fruit fly on citrus in Tripolitania in 1952-53
Plant disease problems in Central America

No. 10.

Some diseases of economic plants in Bihar, India
Aster yellows on various hosts in the United States
Insects and diseases affecting some crops in El Salvador

The sections "Outbreaks and New Records" and "Plant Quarantine Announcements" which appear in each issue contain information on the incidence and spread of destructive plant pests and diseases, and most recent plant quarantine regulations, covering wide geographic range.

FROM PREVIOUS ISSUES

32 p. 651

Plant Disease Situation in the United States

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Resurvey of European Larch Canker

A resurvey for European larch canker, initiated in September 1952, is being conducted to determine the effectiveness of previous attempts to eradicate this introduced disease, and to serve as a guide to the continuation of the eradication program. It has been established that a few cankers were overlooked in the earlier surveys and that a few new cankers have developed in the intervening 14 years.

The first discovery in America of European larch canker, caused by the fungus *Dasyscypha willkommii*, was made in 1927 in Essex County, Massachusetts, on European larch trees. Many cankers were found on European larch (*Larix decidua*), and a few on Japanese larch (*L. leptolepis*). These larches had been imported as nursery stock from Great Britain early in the present century. This disease, which has been well known in Europe for many years, produces destructive trunk and branch cankers and is prevalent in larch plantations in the lowlands of western Europe.

Incipient infections appear as slight depressions in the bark of the stem or branch. On the trunk these depressions may develop into a bow-shaped cavity. The bark at the edge of cankers frequently cracks and often there is a copious resin flow from the affected area. On older cankers the bark falls away, exposing the wood. The cup-shaped, whitish fruiting bodies of the fungus commonly develop near the edge of the cankers. They are most conspicuous in wet weather when they expand into saucer-shaped structures of about 1/8 to 1/4 inch in diameter.

Following the discovery of European larch canker in Massachusetts in 1927 a search for the disease was made in many exotic larch plantations as far west as the Lake States, but no other infection areas were located. The last of these earlier surveys for European larch canker terminated in 1938, by which time more than 3,700 diseased larch trees introduced and planted in the Massachusetts area had been removed and burnt. The disease was not found on our native American larch or tamarack (*L. laricina*) in the area of infection, which is in the border line of the range of this species.

Previous to the discovery of the introduction of *Dasyscypha willkommii* into the United States, closely related fungi belonging to the same genus were known to be distributed throughout North America as harmless saprophytes. Intensive investigation demonstrated that the parasitic *D. willkommii* was morphologically and physiologically distinct from all other related species native to the northern hemisphere and that from a pathological standpoint the latter were unimportant.

In the present surveys, following a 14-year period in which no surveys were made, abundant fructifications of *D. willkommii* have been found on old and new cankers on a very few European larch that had escaped the early eradication program. New infections were also found on small branches of three additional European larch. The infected trees were promptly cut and destroyed.

Our native western larch (*L. occidentalis*) is reported to be very susceptible to European larch canker when planted in Europe. There the principal damage to larch in

plantations is caused by the distortion and weakening of cankered branches and trunks, predisposing them to snow- or wind-break. Control of the disease in Europe is a silvicultural problem, for larch planted on favorable sites not subject to recurring frost damage maintain their vigor and are not seriously injured by this disease. Native larch in the United States, both in the East and West, often occur on sites considered below the optimum range for best growth of the tree. There is accordingly the probability that severe injury may result should the larch-canker organism become established in our native larch stands.

Surveying for larch canker is a difficult and tedious task. Incipient cankers are not only small but may occur on the upper side of branches of large trees where it is impossible to detect them from below. To make sure that cankers of this type are not present, it is necessary to climb trees and scrutinize all branches carefully. Such a survey is now under way in Essex County, Massachusetts. European larch plantations in other sections of the State and in other States, as well as tamarack in the canker-introduction area, must also be inspected to insure complete eradication.

The presence of *Dasyctypha willkommii* on only three newly infected European larch among thousands recently inspected in the Massachusetts area indicates a high degree of success in previous attempts to arrest the spread of this foreign disease. This fact lends encouragement to the belief that European larch canker may be prevented from spreading to our native larch stands.

Occurrence and Hosts of Branched Broomrape in California

It is reported that the branched broomrape, *Orobanche ramosa* L., a parasitic angiosperm, appeared in tomato fields near Centerville, California, in 1929, 1934, and again in 1951-52. Since the initial report of this parasite in 1929, considerable spread has occurred. An unreported outbreak in 1942 just two miles from the focal point of 1929, and one five miles away in 1952, were attributed to the movement of seed-infested soil on farm implements. Winter

floods, which have occurred in this area since 1950, are also believed to have been of considerable importance in spreading seed.

The branched broomrape is a parasitic annual which attacks plant roots. It is devoid of chlorophyll and bears bract-like leaves, true flowers, and seed. Seed is produced in tremendous quantities and appears to germinate only when in close proximity to suitable host roots. Seed is reported to remain viable in the soil for as long as 13 years. Immediately after germination the radicle of the broomrape attaches itself to a host root. At the point of attachment a small nodule is produced, from which tentacle-like roots and ultimately shoots arise. Shoots usually attain a height of 4 to 10 inches and bear purplish-white flowers.

Parasitized tomato plants show evidence of stunting, reduced vitality, and poor yields. However, the full effects of the root parasite on the host are not known. In hemp the quality of fiber has been shown to be greatly reduced. Severe injury depends largely upon an early attack in the life of the host.

This broomrape was probably first introduced into this country from the Orient early in the 19th century as a seed contaminant of hemp. It was first reported in Kentucky, then in Illinois on hemp. Subsequent to 1895 it appeared in Wisconsin on hemp, in Ohio on tobacco, and occasionally in other areas where tobacco is grown.

The economic plants most commonly affected are: tomato, *Lycopersicon esculentum*; hemp, *Cannabis sativa*; tobacco, *Nicotiana tabacum*; and *Taraxacum kok-saghyz*.

In California, branched broomrape was observed in 1952 growing on several hosts not reported previously, namely: *Amaranthus retroflexus*, *Capsella bursa-pastoris*, and *Solanum sarachoides*. In each instance an actual root attachment to the host was observed and photographed. It was also found on *Conium maculatum*, listed previously as a doubtful host, and on *Xanthium spinosum* L., an old reported host. Inasmuch as the infected weed hosts were present only in heavily parasitized tomato fields it is possible that the main stimulus for germination of the broomrape and some nutritional support were derived from tomato.

Flyspeck of Apple in California

Flyspeck caused by *Leptothyrium pomi* (Mont. & Fr.) Sacc., (= *Microthyriella rubi* Petrak) has been identified on apple varieties Double Red Delicious and Newtown Pippin, in the Valencia district, near Aptos, Santa Cruz County. This is believed to be the first report of flyspeck on apple occurring in California.

The symptoms on the fruit appear as smallish, black, semi-circular specks which are superficial on the cuticle. Usually the specks occur in randomized groups; infrequently, however, they may be irregularly distributed over large areas of the apple. Economic losses have ensued because the specks are not easily removed from the

fruit by the use of current handling practices. In culture a slow-growing, gray, compact mycelium characteristic for this fungus was isolated.

The disease is said to have occurred in the previous year, 1951. Limited observations indicate that flyspeck is of serious consequence in this district.

In some parts of this coastal region, the frequent summer fogs maintain the humidity at a high level for intervals of several days and at times may result in the formation of free water by condensation. It is thought that these periods of high humidity, along with suitable temperatures, account for the local occurrence of the disease, since its appearance in eastern areas has been typically associated with summer rains.

Pests of Edible Legumes in Chile

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IN Chile, the production of edible legumes is surpassed only by that of cereals. They occupy more than 130,000 hectares, of which 70 percent is planted to beans and the remainder to lentil, pea, chickpea, broadbean, and hyacinth bean. The yields of these crops tend to decline, partly due to the ever-increasing damage caused by insect pests and lack of good control.

The present notes are an account of the principal pests of the edible legumes in Chile, arranged in the order of their relative importance. Some of them are yet imperfectly known in regard to their taxonomy, ecology, geographic distribution, habits, control and other aspects. Certain other species are present but not common in the country; their potential danger may justify their being included here to provide a complete review.

A number of pests are restricted in distribution by environmental conditions and consequently the acreage of the host crop can be extended safely in the free area. In addition to chemical control, the adoption of proper cultural practice often reduces the damage. For instance, shifting of planting date, proper crop rotation, and flooding have been proved to have beneficial effects on the incidence of certain insects mentioned in the following paragraphs.

Beans (*Phaseolus* spp.)

Seed maggots. The seed corn maggot (*Hyalemya ciliatella* Rond.) and the potato seed maggot (*H. trichodactyla* Rond.), are destructive to germinating seeds of bean, pea, maize, melon and watermelon in Chile. Under certain ecological conditions, different stages of these insects occur at specific times during the season. The information obtained from such observations can be used to advantage in selecting the date of planting so

as to avoid losses due to the soil-infesting stage of these insects. Seed treatment with DDT, BHC, toxaphene, methoxychlor, or calomel also affords effective protection.

Bean moth. The bean moth (*Epinotia opposita* Heinrich) has its permanent foci of infestation in Ligua and Longotoma. The larvae normally prefer to live in the green pods. If the beans are planted late or oviposition is unusually early, the damage may be even greater because the larvae may injure the stem so seriously that the bean plant will fail to fructify, and die. The chrysalides of the moth are found either on the surface of the soil or buried just beneath it. This insect can be controlled effectively when a suitable insecticide is applied as soon as the adult emerges, especially in early spring and before oviposition takes place. Flooding was found to have destroyed at least 30 percent of the pupae of this pest. Experimental results indicate that prolonged irrigation may prove to be an effective method for its control, especially when pupae are abundant underground.

Green bean worm. The larvae of the green bean worm, *Rachiplusia nu* (Guén.), at times severely defoliate bean plants but cause little damage to the pods. The white cocoons are easily found in the enrolled leaves of the following plants: amaranth (*Amaranthus deflexus*), jimson weed (*Datura stramonium*); field bindweed (*Convolvulus arvensis*), "malvilla" (*Malva nicaeensis*), and lamb's quarters (*Chenopodium album*). Early sowing of beans in the Andean and other regions tends to prevent losses due to this insect. Among its natural parasites, the Braconid, *Rogas nigriceps* Brèthes, and the tachina fly, *Incarnia chilensis* Aldrich, have been found in Chile.

Stink bug. The bright colored nymphs of the southern green stink bug (*Nezara viridula* L.) = *Pentatoma apicicorne* Spinola are destructive to beans when the pods are

ripening. It is believed to be introduced from North America.

Bean weevil. The widespread bean weevil, *Acanthoscelides obtectus* (Say), which infests beans in the field as well as in storage, is one of the most serious pests in the culture of beans. Efforts to eradicate it have been unsuccessful, and the weevil is now distributed in several of the central provinces in Chile. Inasmuch as the female weevil oviposits in the ripe dehiscent pods, control can be obtained if the first application of insecticides is carried out before that stage. Late planting also reduces the damage in certain localities.

Leaf hoppers. Among the Cicadellidae occurring on beans, the following species are of particular importance: *Empoasca camara* Dav. & Del., *Atanus eximiosus* Beamer, and other species probably belonging to the genera *Deltoccephalus* and *Thamnotettia*.

Storage pests. In addition to the bean weevil, the more important insects infesting dried beans in storage include the drug-store beetle, *Stegobium (Sitodrepa) paniceum* (L.), granary weevil, *Sitophilus granarius* (L.), and Mexican bean weevil, *Zabrotes subfasciatus* Boh., the latter usually to be found in sieva bean (*Phaseolus lunatus*). Two other coleopterous insects which have not yet become widespread are the lima bean weevil, *Acanthoscelides obreptus* Bridwell, and *Sericoides ruficola* (Solier). The former is still restricted to some small valleys in Tarapacá, the northernmost province of Chile, and the latter to the southern provinces of the country. An olethreutid moth, *Blastobasis* sp. also affects stored beans.

Insects of lesser importance. The lesser cornstalk borer, *Elasmopalpus lignosellus* (Zell.), attacks bean before the pods have formed, and also affects maize and Sudan grass. Among the aphids, *Tullgrenia (Tychea) brevicornis* (Hart) and *T. phaseoli* Pass. attack the underground parts of bean plants. Two leaf-eating weevils, *Listroderes subcinctus* Boh. and *Pantomorus taeniatus* (Berg.) are sometimes destructive. Black beetle, *Blattinus punctulatus* Solier, also injures beans as well as tomatoes.

Locusts attack legumes as well as a great many other plants. In Chile there are no swarm-forming species. All the local locusts are sedentary. The most important species

affecting legumes are *Schistocerca cancellata* (Serv.), *Dichroplus maculipennis* Blanch., *D. elongatus* G. Tos, and *D. vittiger* Blanch., which oviposits adjacent to the roots of sea-shore paspalum (*Paspalum vaginatum*).

Other pests. An unidentified red mite belonging to the family Tetranychidae occurs in Chile, causing considerable damage to beans. Bean slug (*Agriolimax agrestis* L.), attacks bean seedlings soon after emergence. Young plants of bean and pea are injured by hares (*Lepus* spp.), which are being controlled by the use of snares. Certain species of rats cause lesions on bean pods which are in contact with soil. These lesions are easily confused with those caused by chewing insects.

Pea (*Pisum sativum*)

Pea weevil. The pea weevil, *Bruchus pisorum* L., occurs throughout the entire pea-growing area in Chile, except the two southern provinces, Chiloé and Aysén, where less than 40 hectares of peas are grown. In Cautín Province, which leads in pea production with a growing area of 8,000 hectares, representing nearly 30 percent of the total pea acreage in Chile, the incidence of weevil infestation is extremely high, sometimes reaching 85 percent. This alarming figure lends support to the statement made by economists several years ago that the principal difficulty in increasing pea acreage in Chile is the prevalence of the weevil.

Weevil infestation commences in the field in spring, when pea is in blossom and begins to form pods. Eggs are glued by the female to the surface of the green pods. The larvae grow inside the seed and emerge when the seed becomes dry. The adult beetles overwinter either within the pea seed, or inside the bark of certain trees, such as *Eucalyptus*, *Crataegus*, *Schinus molle*, *Casuarina*, and *Platanus orientalis*. Field control of this weevil must be started immediately after the first pea blossoms appear, using parathion, aldrin, BHC or DDT. Planting date affects the development of infestation. Late planting results in low infestation in the harvest; while early planting as commonly practised in the southern uplands usually increases the losses.

Thrips. Onion thrips (*Thrips tabaci* Lind.) is an important factor responsible for loss of peas destined for canning. Affected pods and seed become hard and turn yellow prematurely, and as a result the pods are only partially filled or totally unfilled. It was observed that pea plants infected with powdery mildew (*Erysiphe polygoni* DC.) or fusariosis are less preferred by thrips. Experiments in chemical control of thrips have shown that both the yield and quality of canning peas can be improved when DDT, BHC or aldrin are applied at the proper time. Late sowing also tends to reduce the damage.

Cutworms. Severe outbreaks of cutworms appear periodically in the pea growing areas in Chile, imposing a heavy burden on the producers and seriously reducing the yield and quality of the crop. The most recent serious outbreak occurred in the central provinces, from Santiago to Cautín, in December 1952, damaging many other crops as well as pea. One of the destructive species especially affecting pea is the black cutworm, *Agrotis ypsilon* Rott. The occurrence of natural parasites is partly responsible for reducing the prevalence of cutworms. Two tachina flies, *Archytas infirmus* (Wlk.) and *Gonia pallens* (Wied.), are abundant in the Biobío river region.

Other insects. One of the locust species, *Dichroplus elongatus*, also causes heavy losses to growing pea, especially in Tubul and Raqui in Arauco Province, where the outbreak originates. Among the dipterous insects, the seed corn maggot (*Hylemya ciliatula*) damages the sown seed of pea, and the larva of an unidentified Agromyzid is a leaf and pod miner. None of the aphids occurring on pea are of great economic importance. The most common species are cabbage aphid (*Brevicoryne brassicae* L.) and green peach aphid (*Myzus persicae* Sulz.).

Lentil (*Lens esculenta*)

Crane fly. The crane fly, *Tipula apterogynae* Phil., is one of the most destructive enemies to lentil, especially in Chanco, where it is constantly prevalent. Infestation is usually severe when lentil is planted on land not previously in cultivation or where wild

hosts of the larvae of the fly have been growing.

Cutworms. The most important species of cutworm damaging lentil is *Agrotis suffusa* (Gmelin). It is especially prevalent in Ligua and Longotoma where its permanent foci of infestation occur. Other species are largely controlled by the parasitic tachina flies, such as *Incamiya chilensis*, Aldr., *Peleteria filipalis* (Rond.), *Parasetigena porteri* Brèthes, *Gonia pallens* (Wied.) and *Archytas infirmus* (Wlk.) and by the predatory ground beetle, *Calosoma vagans* Déj.

Other insects. Other insects which may injure this crop include the grape mealy bug, *Pseudococcus maritimus* Ehrh., and several unidentified aphids.

Chickpea (*Cicer arietinum*)

Bean worm. The green bean worm, *Rachiplusia nu*, which defoliates beans also injures the foliage, new pods and green seeds of chickpea. After devastating the seed it frequently pupates within the dry empty pod. *Belonopteris cayennensis*, an insectivorous bird, destroys this pest to a considerable extent in Santa Cruz, Cauquenes, and some other localities.

Other insects. Stored chickpeas are subject to attacks of the same insects infesting stored beans, such as granary weevil, drugstore beetle, and bean weevil. In the field, the white-fringed beetle, *Graphognathus leucoloma* Boh., a very general feeder, causes limited damage to this crop.

Broad Bean (*Vicia faba*)

The following pests of broad bean are known to be of economic importance in Chile: cutworms, crane fly, broad bean leaf miner (*Agromyza* sp.), bean weevil, an unidentified sawfly (Tenthredinidae), leaf cutting bees (Megachilidae), and red spiders (Tetranychidae).

Hyacinth Bean (*Dolichos lablab* L.)

The grape mealy bug is prevalent on Easter Island and the bean weevil occurs commonly on this crop.

Disorders of Fruit Trees Due to Boron Deficiency and Other Causes in Northern Italy ¹

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MINERAL deficiencies of fruit trees in northern Italy have been intensively investigated during the past eight years. As a result, boron deficiency has been established to be the main cause of the disorders of olive trees and deciduous fruits in the Liguria, Veneto, and Trentino-Alto Adige (Tyrol area) regions. The diagnostic symptoms of boron deficiency, however, are frequently obscured by the superimposition of a more or less general potash deficiency which very commonly occurs in commercial orchards in Italy.

Olive 4/23 p 69

Boron deficiency on olive trees was studied chiefly in the olive belt along the Garda Lake on both the Lombardy and Veneto sides, and on the Riviera of Liguria. Observations and records, however, indicate that it is also likely to occur in other regions of the country, including the islands. It is probable that a number of cases of the non-parasitic "brusca" disease, which is characterized by a more or less sudden withering of leaves, are due to the deficiency of boron or other mineral elements.

The symptoms of boron deficiency on olives are rather difficult to define, varying widely with ecological conditions. Symptoms which have been definitely associated with boron deficiency in field experiments include sharply-defined chlorosis in the distal half or third of the leaf which persistently hangs on the branchlets. The foliage of the

boron-deficient tree is sparse, poorly developed and frequently rosetted. New growth appears dwarfed, fasciculate, but profuse. Larger branches and trunk become blistered, with brown, necrotic phloem. Productivity is greatly reduced. The affected trees recover within one year after application of one pound of borax to the soil for each tree, or after injection of boric acid into the trunk.

Two other disorders may easily be confused with the boron deficiency described above. One is characterized by allophyllly, with leaves abnormal in shape and extremely variable in size. The most frequent manifestation is the sickle-shaped leaf. This ailment, as investigated by A. Graniti ² in Sardinia, is developed from bud lesions caused by the olive pollinia scale (*Pollinia pollini*), and a species of mites, *Eriophyes oleae*, also plays a part. Whether disorders with similar symptoms in northern Italy are due to the same cause remains to be determined. The sickle-leaf disorder, however, is easily distinguished from the well-known foliar aberration caused by *Phloeothrips oleae* in continental Italy.

Another disorder manifests witch's broom effects without associated symptoms. The affected trees are entirely unproductive. Its cause is still unknown, and attempts to transmit it by grafting have so far been unsuccessful.

Apple 32 p 84

Boron deficiency is widely distributed in apple orchards, chiefly in the Trentino-Alto Adige region, but occurs less frequently on pear trees. The symptoms vary consider-

¹ Communication No. 13 of the Commission for the Study of Non-Cryptogamic Orchard Diseases. The experimental work was done mainly by E. REFATTI, under the writer's supervision, with the collaboration of the agricultural staff of the regional government.

² Private communication.

ably and can be distinguished mainly in acute and chronic forms.

When the deficiency is acute the fruits are deformed, with pitted, cracked and roughened surface, and brown corky core. These symptoms, which are infrequent and sporadic, were first recorded during the last war.

Chronic boron deficiency, which had been confused with a number of diseases of uncertain causes recorded recently, is more common. It is characterized by atrophy or death of buds, deformation and fall of young leaves, phloem necrosis, and blistering on the branches. These symptoms are most evident in spring, but become somewhat masked by the development of apparently healthy new foliage in summer. Following the onset of these symptoms the twigs die back from the leafless tips and show brown discoloration in the fibro-vascular bundles. Subsequently, the excessive growth arisen from the wood below the dead portion gives

rise to a foliar rosette condition. On the lower portion of the affected tree, the leaves appear nearly normal, but scattered brown spots are found in the phloem.

The boron-deficient trees fail to produce fruit from the first year the symptoms appear, and die within three or four years. Complete recovery can be obtained if the soil is treated with approximately one pound of borax per tree, at earlier stages.

Prune and Peach

A peculiar dieback of prune trees in Lombardy and Emilia, and of peach trees in the Piedmont, is possibly caused by boron deficiency, but additional evidence is needed. The dieback is associated with the shriveling of buds, cambial necrosis, bark blisters and gummosis. Leaves become chlorotic, brittle and frequently boat-shaped. Affected trees fail to produce fruit.

A New White Grub on Apple in Israel

N. PLAUT

Division of Plant Protection, Ministry of Agriculture, Jaffa

SINCE 1948, sporadic cases of heavy root damage to apple seedlings and young trees have been reported from different localities in the Huleh Valley in the eastern part of upper Galilee. The first recorded case occurred in Lehavoth Habashan, where the cause was identified by Dr. J. Rivnay as the grubs of a species of *Pentodon* (Scarabaeidae).

The grubs, reaching up to 4 cm. in length, feed on main roots or the underground parts of stems of seedlings, until these are almost severed at 5 to 20 cm. below the surface of the soil. Usually one grub, never more than two, were found on one seedling. After having sustained severe damage the seedling starts wilting and finally withers.

Unsuccessful Control Efforts

When, in 1951, a large regional tree nursery was set up in the center of the affected area, the organizers were warned of the probability of an outbreak of this pest. The risk incurred seemed considerable, because there existed no local experience in effective and practicable control of grubs under the circumstances described. As had been feared, an outbreak of considerable intensity occurred later in the season of 1952. Some emergency control measures adopted were of no avail.

As a tentative preventive measure, the plowing in of Gammexane, under the trade name of Agrocide 3, before planting, at the rate of 8 kg. per dunam (1 dunam = 0.1

hectare) was recommended and was carried out during February 1952 on half the area of the nursery. In August, the first reports on grub damage to be received indicated that the treated area suffered as much as the untreated.

On 20 August and 20 October BHC and dieldrin in various amounts were introduced into the soil by injecting or spraying. Despite these treatments the wilting of grafted stocks progressed, and the consecutive countings carried out at intervals of 2 to 4 weeks failed to show that the treatments had any beneficial effect.

Losses

During the period from the beginning of August, when the wilting started, to early October, 1,320 out of a total of about 43,000 grafted stocks were killed and had to be removed. The following stocks were affected with equal intensity: *Malus* (a name of a local stock), Hashabi (local variety), East Malling 2, 9 and 13.

Seedlings of quince, almond, and olive grown in the same nursery were not affected. A few isolated cases of heavy damage on grape vines and roses by white grubs of unidentified species, however, have been reported from different localities in the country.

Further laboratory and field experiments on the control of this newly-discovered pest are under way, including the incorporation of BHC into the pit soil at planting time, and the use of aldrin and parathion.

Outbreaks and New Records

Egypt

Entomological Section, Ministry of Agriculture, Cairo

Infestation of Cotton Worm

THE 1952 infestation of *Prodenia litura* F. on cotton was light all over the country, except in Fayoum Province, where there were severe outbreaks. From September this pest was found on clovers, and in November wide areas of clover fields in the north of the Delta were under attack but the infestation was rather limited in the middle and south of the Delta. Arsenical dust or cotton dust (3 percent BHC, 10 percent DDT and 40 percent sulphur) was used for its control. The attack ended by mid-December, due to cold weather. In January 1953, fields were plowed after the first cut of clovers, to

destroy the hibernating worms and to prepare for cotton cultivation.

Outbreaks of Black Cutworm

The black cutworm, *Agrotis ypsilon* Rott., attacked a number of crops, including clover, vegetables, lentils, wheat and barley, throughout the period from October 1952 to January 1953. In December, the infestation was found to range from light to medium in Upper Egypt, especially destructive in Assout Province. Control was effected by the use of the poison-bran bait and hand collection of caterpillars. In March, it began to attack young cotton plants in limited areas in Assout and Gerga Provinces.

Malaya

S. P. WILTSHIRE

Commonwealth Mycological Institute, Kew, England

New Hosts of Pathogenic Fungi

Botryodiplodia theobromae Pat. causing fruit rot of *Garcinia mangostana* (mangosteen), and *Carica papaya* (papaya).

Ganoderma pseudoferreum (Wakef.) Over. & Steinn. causing red root disease of *Indigofera taysmanii*.

Rhizoctonia solani Kühn, causing leaf rot of *Pachyrrhizus erosus* (yam bean), *Ornithopus sativus* and *Desmodium scorpiurus*.

Cause of Stem Rot of Manila Hemp

Stem rot of Manila hemp, *Musa textilis*, previously reported as due to *Marasmius stenophyllus* Mont. which causes root rot of banana, is now attributed to *M. subplexifolius* Murrill.

The above information was received by the Commonwealth Mycological Institute from L. N. H. Larter, Acting Chief Research Officer, Department of Agriculture, Malaya.

Netherlands New Guinea

H. W. MOLL

Section of Agricultural Research

Service for Economic and Technical Affairs, Hollandia

Banana Leaf Spot: a New Record

The previously undetermined disease in the banana plantings of the demonstration farm at Kota Radja near Hollandia was identified with the help of C. J. Magee, Chief Biologist, Department of Agriculture, New South Wales, Australia, as a severe case of banana leaf spot caused by *Cercospora museae* Zimm. The fungus causes spotting and destruction of foliage, and in the mature plants the bunch usually falls down before it is fully mature. This rather unusual response to a leaf spotting disease is brought about by the latent infection of the pathogen. Infection occurs in a very young stage but the spots become evident only when the leaves become mature during later stages of development. After the plant has bunched, however, all leaves may die because infection, previously latent, reaches an active phase even in the last emerged leaves. Later, secondary organisms cause the petioles and even the apex of the pseudostem to rot and eventually the true stem carrying the bunch bends over.

Gray Mold of Beans

Gray mold, probably caused by *Botrytis cinerea* Fr. was noticed on beans in Oransbari, south of Manokwari. The disease caused more damage to bean varieties with violet seed than to those with brown seed. The outbreak of the disease was favored by a rainy period.

Outbreaks of Rice Insects

During March and April 1953, the prevalence and seasonal distribution of two rice insects, white rice borer (*Scirpophaga*

innotata Walker) and rice casebearer (*Nymphula depunctalis* Guén.), were recorded on six paddy varieties grown in the Merauke area. The results are as follows:

Variety	Mar. 2	Mar. 16	Mar. 30	Apr. 13
<i>Scirpophaga innotata</i>				
Brit. Guyana 75	35 %	20 %	5 %	0 %
Markoenti	50	35	10	3
Boeloeh merah . .	10	5	3	0
Osok	10	10	3	0
New Guinea . . .	10	5	5	3
Ramcajara	10	5	2	0
<i>Nymphula depunctalis</i>				
Brit. Guyana 75	50	30	5	2
Markoenti	15	10	5	2
Boeloeh merah . .	10	10	2	0
Osok	10	5	2	0
New Guinea . . .	5	10	5	3
Ramcajara	10	5	2	0

From the results summarized above, varietal difference in the susceptibility to these two insects is evident. The white rice borer is most damaging to the variety Markoenti, while British Guyana 75 is more susceptible to the larvae of the rice casebearer, which is known locally as "hama poetih." It is remarkable that, owing probably to the occurrence of some hymenopterous parasites, both pests disappeared almost entirely in April, during which month even the most susceptible varieties, Markoenti and British Guyana 75, fully recovered from the injuries with yields only slightly affected. Spread of the pests from early to later planted paddy hardly occurred. These observations confirm the experience we had in other years.

PLANT QUARANTINE ANNOUNCEMENTS

Belgian Congo

Ordinance No. 51/431 of 22 December 1952, prohibits the importation of maize on account of the danger of introducing the maize rust (*Puccinia polysora* Underw.). Maize, in any form whatsoever, is not permitted entry into the Belgian Congo, except under authorization of the Governor General.

Chile

Decree No. 277 of 24 April 1953, published in the Diario Oficial de la República de Chile No. 22553, 22 May 1953, modifies Decree No. 622 of 15 May 1950, with regard to the importation of potatoes and sunflowers.

In view of the desirability of introducing foreign potato varieties resistant to late blight, the previous embargo as provided in Article 42 (4) of Decree No. 622 is relaxed. Under the present Decree, potato or any other tubers of the genus *Solanum* may be imported by the Department of Agricultural Research or other established institutions, if a shipment of each variety does not exceed a limited quantity, i. e., 5000 kg. for varieties which are resistant to late blight or other serious diseases, or 25 kg. for new varieties whose resistance has not been proved. All imported seed potatoes shall be grown in quarantine under supervision of the Department of Plant Protection, and shall be subject to destruction when the presence of a serious disease is detected or suspected.

In order to prevent the introduction of the sunflower rust (*Puccinia helianthi*), the importation of sunflower seed and grain is prohibited except by the Department of Agricultural Research for experimental purposes. Each shipment must not exceed 10 kg. per variety and the imported seed shall be grown under quarantine and subject to appropriate phytosanitary measures. This provision constitutes an addition to Article 43 of Decree No. 622.

Decree No. 190 of 21 March 1953, published in the Diario Oficial de la República de Chile No. 22531, 23 April 1953, authorizes importation from the United States through the Department of Enology and Viticulture, of a specified number of grape vine stocks of 15 specified varieties, which should be accompanied by a phytosanitary certificate issued by an Inspector of the Bureau of Entomology and Plant Quarantine, attesting that the stocks are free from vine phylloxera and downy

mildew, and have been fumigated with methyl bromide. The imported stocks shall be grown for two years or longer under quarantine.

Cyprus

Agricultural Produce Export Regulations, made under the Agricultural Produce (Export) Law on 12 May 1953, were published in Supplement No. 3 to the Cyprus Gazette No. 3689, 14 May 1953.

The Regulations set forth general requirements for any agricultural produce to be exported direct or in transit, including compulsory inspection. On passing a consignment the inspector shall issue an inspection certificate in prescribed form, certifying, among other matters, that the following pests and diseases do not occur in Cyprus: Vine phylloxera (*Phylloxera vastatrix*), Colorado beetle (*Leptinotarsa decemlineata*), flea beetle (*Epitrix cucumeris*), and wart disease (*Synchytrium endobioticum*). Detailed specific restrictions, together with grading standards and packing requirements, are given for the more important exportable produce. Citrus fruit, pomegranates, fresh and dried fruit and onions, should be free from pests and diseases to the required degrees. Onion sets should be entirely free from white rot (*Sclerotium cepivorum*) and potatoes from tuber moth (*Phthorimaea operculella*).

Notice of the Director of Agriculture of 16 June 1953, published in Supplement No. 3 to the Cyprus Gazette No. 3699, 18 June 1953, adds the following pests and diseases from which potatoes intended for export should be free: Mealy bugs (*Pseudococcus citri*), potato tuber eelworm (*Ditylenchus destructor*), late blight (*Phytophthora infestans*), common scab (*Actinomyces* spp.), dry rot (*Fusarium* spp.), blackleg (*Erwinia phytophthora*), and spraing (an internal discoloration).

Gold Coast

The Importation of Plants (Amendment) Regulations of 28 May 1953 and the Importation of Plants (Amendment) (No. 2) Regulations of 30 May 1953, published in the Supplement to the Gold Coast Gazette No. 49, dated 20 June 1953, amend the importation of Plants Regulations (No. 25) of 6 May 1936.

The first amendment adds sugar cane to the plants and seeds enumerated in Schedule I, Group A, which previously included cocoa, cotton,

cassava, oil palms and all species of *Musa* and of *Citrus*. These plants are permitted entry from West African countries, which have made agreements with the Government of the Gold Coast concerning the enforcement of regulations on the interchange of plants and seeds, only under permit signed by the Director of Agriculture and in accordance with any special conditions stated in the permit.

The second amendment revokes the form of the phytosanitary certificate previously given in Schedule III of the principal Regulations and substitutes it by one which is identical with the model annexed to the International Plant Protection Convention, 1951.

Netherlands

State Gazette No. 302 of 18 June 1953 amends further the San José Scale Decree of 27 July 1951, State Gazette No. 330, with regard to the post-entry treatment of imported plant materials.

Planting or transplanting of living woody plants imported from a foreign country, except

conifers and Ericaceae, is prohibited during the first two full growing seasons after entry, unless previous notification is given to the Netherlands Plant Protection Service and unless they are planted at least two meters distant from other living woody plants. Transport of such plants is prohibited without permission by the Director of the Plant Protection Service. The period of a full growing season is from 1 May to 1 September.

Tunisia (France)

Decree of the Minister of Agriculture of 10 June 1953, published in the Journal Officiel Tunisie, Vol. 71, No. 47, 12 June 1953, modifies the Decree of 27 November 1952, concerning the importation of fresh and forced fruits originating in or proceeding from countries infested by the San José scale (see FAO Plant Prot. Bull. 1:94, 1953). The present Decree removes the Netherlands from the list of countries where the San José scale is known to occur, because this pest has been eradicated from the Netherlands.

NEWS AND NOTES

Colorado Beetle in Western Europe in 1952

The European Plant Protection Organization has completed a survey and appraisal of the Colorado potato beetle situation in Western Europe during 1952. A detailed report, based on information received from its member governments, will be published shortly. The general situation is as follows:

The Colorado beetle has not become established in the British Isles or in any part of Scandinavia. Constant vigilance has been maintained at the beaches and borders, and isolated beetles or colonies discovered have been promptly exterminated. There is hope that any advance of the beetle to these countries can be prevented indefinitely, but there is always the possibility that, under favorable conditions, populations may build up on the mainland to such an extent that abnormal flights and movement of beetles may occur and overwhelm the defences of the beetle-free countries.

In the northern and central parts of continental Western Europe including France, Benelux countries and Germany, the beetle infestations became gradually lighter due to unfavorable conditions for the development of the pest during the past two years and the gradual but steady improvement in the administration of the compulsory control in all countries concerned. The

supply of insecticides and machinery has also improved and the newer synthetic insecticides are gradually proving their worth. Above all, there has been a co-ordinated international effort initiated and fostered by the European Plant Protection Organization. Losses due to the beetle in 1952 were, in general, negligible with the exception of the Saar where losses were estimated to be about 4 to 5 percent.

In the countries south of France and Germany, the invasion of the beetle is in general expanding and much improvement is not yet to be expected. In Spain and Portugal the beetle has reached its southern limits and the infestations in the south of these countries will increase almost inevitably along the shores of the Mediterranean. Under such circumstances flights of the beetle must be expected and there will be a very serious threat to North Africa across the narrow Straits of Gibraltar. Crop losses in 1952 due to the beetle were about 2 to 3 percent in Portugal and 4 to 5 percent in Spain.

While Greece and Turkey remain free of the pest, in Italy and Yugoslavia there will inevitably be a further spread southeastwards. The prevention of the movement of the beetle to free areas in these countries is still of considerable importance. In Yugoslavia, 4,600 hectares of potatoes in Slovenia and Croatia were infested in 1952 compared with 988 hectares in 1951. In

Italy, the infestations were more intense than in the previous year, especially in Piedmont, Liguria and Venezia in the north and Tuscany and Marche in the center. Altogether, 74,200 hectares out of 165,000 hectares of potatoes grown in the country were attacked and the loss was estimated at 7.8 percent of the crop.

In Austria, the beetle was found practically throughout the country but infestations were even more intense in the north and west. Of 170,000 hectares of potatoes grown in Austria, some 30,000 hectares were infested in 1952 as compared with 20,000 hectares in 1951.

Campaign Against Olive Fly in Spain

Spain has launched an organized campaign during the current season to effect compulsory control of the olive fly in the Province of Tarragona on the Mediterranean coast. As one of the most important olive growing regions, this Province has suffered heavy annual losses due to this insect.

The campaign was organized at the request of the Farmers' Unions, as a result of the general recognition of the effectiveness of the glass-trap method which has gained widespread use in the country during the past ten years. In 1952, adequate protection of 1,700,000 olive trees was achieved in Tarragona alone.

A special committee has been established to direct the campaign being carried out in 99 designated municipalities in the south of the Province,

covering about 5,000,000 olive trees. Circulars containing instructions on control measures have been issued, and the provincial agricultural officers will assist and supervise the growers in technical problems.

The fly trap, developed by the Plant Protection Station at Burjasot, has a capacity of 300 cc., using a 2 percent solution of ammonium phosphate as bait. The traps were installed from the middle of June onward, with at first one million traps requiring 30 metric tons of ammonium phosphate for the five million trees. The traps are to be refilled monthly during the six-month period. The growers are requested to notify the Committee of the average number of flies caught in a trap, and more traps will be distributed when the infestation increases in any locality. The most intensive operation will take place in September and October. Growers who are negligent in carrying out the measures or fail to co-operate will be fined.

When the fly population increases to a marked degree growers are cautioned not to rely upon the fly traps alone, but to spray an arsenic-molasses solution on one or two branches on the southern side of each tree as an additional measure.

Further extension of this campaign will largely depend upon the prospect of the crop and upon the availability of funds for the required equipment and bait.

The above information was communicated by Miguel Benlloch of the Estación de Fitopatología Agrícola at Madrid.

CEREAL BREEDING PROCEDURES

Recently published, this FAO Development Paper covers the whole field from the hybridization of the parent plants until a new variety is in commercial production. Methods of growing hybrid populations, systems of testing and recording of results, variety purification and increase of pure seed, as well as the analysis of data, are treated in detail. Various types of nurseries are described for the breeding of varieties resistant to plant diseases and insect pests, and tolerant to certain climatic factors such as frost.

Special features of the publication are the sixteen appendices which graphically illustrate planting plans, plot arrangements, the statistical progress of a cross, variety purification and other features of a cereal breeding program. The complexity involved in modern plant breeding methods and the consequent necessity of systematizing the procedures are clearly and impressively indicated. 122 pages, \$1.25; 6/3.

LEGUMES IN AGRICULTURE

This unique collection of information on legumes, edited by R. O. Whyte, G. Nilsson-Leisner and H. C. Trumble, required the collaboration of specialists in every member country of FAO. No fewer than 111 contributors are acknowledged, and contributions from many more are mentioned in the text.

Nowhere else is such information available in one volume and, by pointing to the limitations in the data on economic botany, ecology and the biotic relationships of legumes it is hoped to encourage further research and experiment particularly in tropical and sub-tropical areas. An appendix tabulates the species, indicating plant characteristics, climatic adaptation, soil adaptation, utilization, number of seeds per pound and seeding rates in pounds per acre. 368 pp., many illustrations, \$ 3.00; 15s.

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